Chemical Abst.
Vol. 48 No. 4
Feb. 25, 1954
General and Physical Chemistry

The influence of adsorption-active media on the mechanical properties of metals. V. I. Likhtman and P. A. Rebinder. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 17, 313-32(1953).—The resistance of solids to stress and rupture is lowered by adsorbed surface-active layers which lower the surface tension and penetrate into microcracks preventing the interlocking at this spot. It was observed on Sn and Pb monocrystals treated with solns. of oleic and palmitic acid or cetyl alc. in heptane, kerosine, etc., that the limit of plastic flow is decreased according to $\Delta P_m = (P_m)_o - (P_m)_a$ (a = adsorbed, o = nonadsorbed medium, P tension corresponding to the limit of plasticity). The max. of action is obtained for Sn and oleic acid at a concn. of 0.2%, corresponding to a satd. adsorption layer. At this concn. the thickness of segments of slip is a min. as well as the "coeff. of strengthening" $\lambda = dP_s/da$ ($P_s = P \sin \chi_0 \cos \chi$; $a = 1 + \epsilon (\sin(\chi_0 - \chi)/\sin^2 \chi_0)$; P = stress, χ_0 initial lattice orientation, χ = final lattice orientation, ϵ remaining deformation). Thermodynamics of surfaces show that mech. dispersion of solids in adsorption-active media leads

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to a highly dispersed or colloidal fraction absent in a non-active medium. The plot of the adsorption effect vs. the speed of deformation at different temps. shows that at room temp. the lowering of the rupture stress of Pb by adsorption is important only in the range of 100–400%/min. with a max. at 200–250%/min. At 100° this max. is shifted to 800–900%/min. independently of the surface-active substance. For Sn the max. are 5%/min. at 20° and 500–600%/min. at 100°. Cycling the stress in a special app. produces relaxation effects, and it is shown that adsorption-active media change these relaxation effects completely. The phenomenon of creep as distinct from plastic flow is discussed and by a further analysis of the creep equation $P = P_\epsilon + \lambda\epsilon + (\eta d\epsilon/d\tau) - \varkappa\tau$ (cf. Likhtman *C.A.* 45, 7493*g*) the creep is resolved into a stationary and a nonstationary component. Inactive hydrocarbon solvents have no action on the creep of Sn; polar compds. exercise an action, going through a max. of concn. The amt. of action is detd. by [—COOH] > [—OH] > [—$COOCH_3$] > [—Cl]. The concns. $c_{max.}$ decrease with the increase in mol. wt. in a homologous series (for propionic, caprylic, stearic acids c_m = 0.640, 0.118, 0.007 mol./l., resp.; for weak adsorbents Me laurate and lauryl chloride c_m = 35% and 48%, resp.). The nature of the solvent for the active substance is equally very important. The viscosity η and the strengthening coeff. λ of Sn are considerably decreased by surface-active adsorbents. Similar effects of smaller magnitude were observed on polycryst. Cu and Al wires. Adsorption also reduces resistance to fatigue. Electrocapillary tests of creep in solns. of 0.1*N* Na_2SO_4 (after reduction of oxide layers) show that the effect is localized on the surface and independent of any mineral films (cf. E. K. Venkstrem and P. A. Rebinder, *C.A.* 47, 5702*c*). Serge Paksver

REBINDER, P.A.

Electron microscope study of the effect of surfactant on the crystallization of mineral hydrates of cement clinker. A. D. SHEKHTER, N. N. SERB-SERBINA, AND P. A. REBINDER. *Doklady Akad. Nauk S.S.S.R.*, 80 (1) 129-32 [illegible] microscope was used to study the hydration of tricalcium aluminate with and without the addition of sulfite alcohol wash water. After hydration for several minutes in water only, the gel consisted of thin platelike hexagons; this structure underwent no noticeable change after 7 days' hydration. In the presence of sulfite alcohol wash water, there were no hexagonal crystals but only elongated crystals (rods) which increased in length with time and formed a skeletal cellular structure. As concentration of surfactant increased from 0.1 to 0.5%, the rate of growth of crystals (lengthwise) and of cellular structure increased. Debyegrams showed that crystalline lattices of the hydrates in water, with and without the addition of the surfactant, were alike. B.Z.K.

VOYUTSKIY, S.S.; SHTARKH, B.V.; REBINDER, P.A., akademik.

Effect of the molecular weight, the form of molecules and the presence in it of polar groups, on autohesion of high polymers. Dokl.AN SSSR 90 no.4: 573-576 Je '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Rebinder). 2. Tsentral'nyy nauchno-issledovatel'skiy institut kozhzameniteley (for Voyutskiy, Shtarkh).
(Polymers and polymerization)

NIKOLAYEV, B.A.; REBINDER, P.A., akademik.

Elastic-plastic-viscous properties of dough. Dkol.AN SSSR 90 no.4:595-598 Je '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Rebinder). (Dough)

TOLSTOY, D.M.; REBINDER, P.A.

Effect of normal load on the force of friction, in presence of mixed boundary-hydrodynamic lubrication. Dokl.AN SSSR 90 no.5:819-822 Je '53. (MLRA 6:5)

1. Moskovskiy stankoinstrumental'nyy institut im. I.V. Stalina (for Tolstoy). 2. Akademiya nauk SSSR (for Rebinder). (Friction) (Lubrication and lubricants)

VINOGRADOV, G.V.; BEZBORODʹKO, M.D.; REBINDER, P.A., akademik.

Viscous properties of plastic lubricants and rotation resistances of roller bearings. Dokl. AN SSSR 90 no.6:1019-1022 Je '53. (MLRA 6:6)

1. Akademiya nauk SSSR (for Rebinder).
(Roller bearings) (Lubrication and lubricants)

ZUEV, Yu.S.; KUZ'MINSKIY, A.S.; REBINDER, P.A., akademik.

Certain peculiarities of light ageing of vulcanized rubbers. Dokl. AN SSSR 90 no.6:1063-1066 Je '53. (MLRA 6:6)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti. 2. Akademiya nauk SSSR (for Rebinder). (Rubber)

URAZOVSKIY, S.S.; SHCHIPKOVA, I.S.; REBINDER, P.A., akademik.

Effect of variability in fine chemical structure on the reactive power of substances. Dokl. AN SSSR 90 no.6:1079-1082 Je '53. (MLRA 6:6)

1. Akademiya nauk SSSR (for Rebinder).
(Chemical reactions) (Carbon compounds)

SYUTKIN, I.F.; REBINDER, P.A., akademik.

Intermittent deformation in the planilinear "elastic" zone of a dilation diagram. Dokl. AN SSSR 91 no.1:83-85 Jl '53. (MLRA 6:6)

1. Akademiya nauk SSSR (for Rebinder). 2. Ural'skiy gosudarstvennyy universitet. (Deformations (Mechanics))

MIKHAYLOV, N.V.; KLESMAN, V.O.; REBINDER, P.A., akademik.

Two structural modifications of solid synthetic polyamides. Dokl. AN SSSR 91 no.1:99-102 Jl '53. (MLRA 6:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna. 2. Akademiya nauk SSSR (for Rebinder). (Amides)

NOVOKRESHCHENOV, P.D.; REBINDER, P.A., akademik.

New phenomenon of self-angulation of wire from polycrystalline metals during elongation. Dokl. AN SSSR 91 no.1:123-124 Jl '53. (MLRA 6:6)

1. Tul'skiy gosudarstvennyy pedagogicheskiy institut. 2. Institut fizicheskoy khimii Akademii nauk SSSR. 3. Akademiya nauk SSSR (for Rebinder).
(Wire) (Deformations (Mechanics))

USSR/Metallurgy - Tin, Deformation 1 Jul 53

"Influence of Oxide Films on the Effect of Adsorption Facilitation in the Deformation of Metallic Single Crystals," V. N. Rozhanskiy, Acad P. A. Rebinder, Moscow State U

DAN SSSR, Vol 91, No 1, pp 129-131

Investigates effect of vapors of adsorptive substances at various concns in vacuum on creep of Sn single crystals, coated with oxide film or free of it. Concludes that oxide film creates non-uniformly-stressed condition in monocryst wire

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includes graphs. 13 Ref.

under tension, and this condition promotes easing of adsorption on deformation.

SINITSYN, V.V.; VINOGRADOV, G.V.; REBINDER, P.A., akademik.

Surface effect and viscous-thermal properties of Na-lubricants. Dokl.AN SSSR 91 no.2:323-326 Jl '53. (MLRA 6:6)

1. Akademiya nauk SSSR (for Rebinder). (Lubrication and lubricants) (Viscosity)

REBINDER, akademik; GUREVICH, A.A.

Catalytic effect of iron on the reduction of o-dinitrobenzene with ascorbic acid. Dokl.AN SSSR 91 no.3:543-544 Jl '53. (MLRA 6:7)

1. Moskovskaya sel'skokhozyaystvennaya akademiya imeni K.A.Timiryazeva (for Gurevich). 2. Akademiya nauk SSSR (for Rebinder).
(Reduction, Chemical) (Benzene derivatives) (Ascorbic acid)

URAZOVSKIY, S.S.; GUNDER, O.A.; REBINDER, P.A., akademik.

Molecular forms of acetamide. Dokl.AN SSSR 91 no.4:885-888 Ag '53.
(MLRA 6:8)

1. Akademiya nauk SSSR (for Rebinder). 2. Khar'kovskiy politekhnicheskiy institut im. V.I.Lenina (for Urazovskiy and Gunder).
(Acetamide)

BARTENOV, G.M.; NOVIKOV, V.I.; REBINDER, P.A., akademik.

On the modulus of rubber under static compression. Dokl.AN SSSR 91 no.5:1027-1030 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Rebinder). 2. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti. (Rubber)

GARKUNOV, D.N.; KRAGEL'SKIY, I.V.; REBINDER, P.A., akademik.

Effect of the relationship between the degree of surface friction and hardness on the sliding properties of contacting machine parts. Dokl.AN SSSR 91 no.5:1085-1088 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Rebinder). (Friction)

VINOGRADOV, G.V.; GVOZDEV, M.M.; REBINDER, P.A., akademik.

Elastic-tensile properties and start characteristics of plastic lubricants. Dokl.AN SSSR 91 no.5:1151-1154 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Rebinder). (Lubrication and lubricants)

VOYUTSKIY, S.S.; KAL'YANOVA, K.A.; PANICH, P.M.; FODIMAN, N.M.; REBINDER, P.A., akademik.

Mechanism of filtering out the dispersed phase of emulsions. Dokl.AN SSSR 91 no.5:1155-1158 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Rebinder). 2. Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V.Lomonosova (for Voyutskiy, Kal'yanova, Panich, Fodiman). (Filters and filtration) (Emulsions)

GUREVICH, A.A.; REBINDER, P.A., akademik.

Photochemical method in comparative phyto-actinometry. Dokl.AN SSSR 91 no.5: 1221-1223 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Rebinder). 2. Moskovskaya sel'skokhozyaystvennaya akademiya im. K.A.Timiryazeva (for Gurevich).
(Botany--Physiology) (Actinometer)

KOCHANOVA, L.A.; YAMPOL'SKIY, B.Ya.; REBINDER, P.A., akademik.

Effect of oxide films on the deformation of aluminum in inactive and active media. Dokl.AN SSSR 92 no.1:119-122 S '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Rebinder). 2. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova (for Kochanova and Yampol'skiy).
(Aluminum--Metallography) (Oxides)

TALMUD, S.L.; IVANYUSHKINA, A.M.; POPOVA, L.A.; YANZUVAYEVA, L.P.; REBINDER, P.A., akademik.

Refining of cellulose by the fractionation of fibre. Dokl.AN SSSR 92 no.2:397-398 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Rebinder). 2. Leningradskiy tekhnologicheskiy institut im. V.M.Molotova (for Talmud, Ivanyushkina and Popova). (Cellulose)

SPIVAK, G.V.; KANAVINA, N.G.; CHERNYSHEV, I.N.; SBITNIKOVA, I.S.; REBINDER, P.A., akademik.

Electron optical method for the reflection of magnetically heterogeneous objects. Dokl.AN SSSR 92 no.3:541-543 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Rebinder). 2. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova (for Spivak, Kanavina, Chernyshev and Sbitnikova). (Electron optics) (Electromagnetism)

VEYLER, S.Ya.; YEPIFANOV, G.I.; REBINDER, P.A., akademik.

Effect of lubricants on the coefficient of friction during the deep draw of metals. Dokl.AN SSSR 92 no.3:593-595 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Rebinder). 2. Institut fizicheskoy khimii Akademii nauk SSSR (for Veyler and Yepifanov).
(Lubrication and lubricants) (Metals)

KARPENKO, G.V.; KARLASHOV, A.V.; REBINDER, P.A., akademik.

Effect of the absolute size of samples on the adsorption and corrosion fatigue of steel. Dokl.AN SSSR 92 no.3:603-605 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Rebinder). 2. Institut mashinovedeniya i avtomatiki, Akademiya nauk Ukrainskoy SSR (for Karpenko and Karlashov).
(Steel)

KROTOVA, N.A.; KARASEV, V.V.; REBINDER, P.A., akademik.

Investigation of electron emission during the splitting of solids in a vacuum. Dokl.AN SSSR 92 no.3:607-610 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Rebinder). 2. Institut fizicheskoy khimii Akademii nauk SSSR (for Korotova and Karasev).
(Electrons) (Solids) (Adhesion)

BARTENEV, G.M.; LEPETOV, V.A.; NOVIKOV, V.I.; REBINDER, P.A., akademik.

Static compression of flat ring-shaped rubber washers. Dokl.AN SSSR 93 no.1: 15-18 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Rebinder). (Elastic plates and shells)

KRAGEL'SKIY, I.V.; BESSONOV, L.F.; SHVETSOVA, Ye.M.; REBINDER, P.A., akademik.

Contacting lapped surfaces. Dokl.AN SSSR 93 no.1:43-46 N '53.
(MLRA 6:10)

1. Akademiya nauk SSSR (for Rebinder). (Surfaces (Technology))

RATNER, S.B.; REBINDER, P.A., akademik.

On the role of roughness in the friction of rubber and on the law of friction. Dokl.AN SSSR 93 no.1:47-50 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Rebinder). (Friction) (Rubber)

BELITSKAYA, R.M.; DEGTEVA, T.G.; KUZ'MINSKIY, A.S.; REBINDER, P.A., akademik.

Combined oxidation of rubber and its accelerators in "swollen" vulcanized rubber. Dokl.AN SSSR 93 no.1:81-83 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Rebinder). (Vulcanization)

GRIGOROV, O.N.; BARABANSHCHIKOVA, N.K.; REBINDER, P.A., akademik.

Electrokinetic phenomena on open surfaces. Dokl.AN SSSR 93 no.1:89-92 N '53.
(MLRA 6:10)

1. Akademiya nauk SSSR (for Rebinder). 2. Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova (for Grigorov and Barabanshchikova).
(Electroosmosis)

LIKHTMAN, V.I.; OSTROVSKIY, V.S.; REBINDER, P.A., akademik.

Effect of oxide films on the mechanical properties of cadmium monocrystals.
Dokl.AN SSSR 93 no.1:105-107 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Rebinder).
(Cadmium) (Metallic oxides) (Crystallochemistry)

RYBALKO, F.P.; FARAFONOV, V.K.; REBINDER, P.A., akademik.

Destructive stresses in torsional deformation of isotropic materials. Dokl. AN SSSR 93 no.4:651-654 D '53. (MLRA 6:11)

1. Akademiya nauk SSSR (for Rebinder). 2. Ural'skiy gosudarstvennyy universitet im. A.M.Gor'kogo (for Rybalko and Farafonov).
(Strains and stresses) (Deformations (Mechanics)) (Torsion)

LIKHTMAN, V.I.; REBINDER, P.A.; KARPENKO, G.V.; YEGOROV, N.G., redaktor; NEVRAYEVA, N.A., tekhnicheskiy redaktor

[Effect of a surface-active medium on processes of metal deformation] Vliianie poverkhnostno-aktivnoi sredy na protsessy deformatsii metallov. Moskva, Izd-vo Akademii nauk SSSR, 1954. 206 p. (MIRA 8:4)
(Deformation (Mechanics)) (Metals)

REBINDER, P.A.

OSIN, B.V.; REBINDER, P.A., akademik, redaktor; TYUTYUNIK, M.S., redaktor; LYUDKOVSKAYA, N.I., tekhnicheskiy redaktor

[Quicklime as a new binder] Negashenaia izest' kak novoe viazhushchee veshchestvo. Pod red. P.A.Rebindera. Moskva, Gos. izd-vo po stroit. materialam, 1954. 383 p. (MLRA 8:7)
(Lime) (Binders (Chemistry))

USSR/Chemistry

FD-1240

Card 1/1 : Pub. 129-2/25

Author : Segalova, Ye. Yi.; Rebinder, P. A.; Luk'yanova, O. I.

Title : Physico-Chemical investigation of structure formation in cement suspensions.

Periodical : Vest. Mosk. un., Ser. fizikomat. i yest. nauk, 9, No 1, 17-32, Feb 1954

Abstract : Investigated the process of cement hardening and the effect of using additives such as sulfite-alcohol wash (by-product of pulp and paper production), surface-active agents, and gypsum.

Institution : Chair of Colloid Chemistry

Submitted : July 11, 1953

USSR

Dependence of the colloidal solubility of some organic liquids on the concentration of the dissolving substance. Z. N. Markina, K. A. Pospelova, and P. A. Rebinder (State Univ., Moscow). *Kolloid. Zhur.* 16, 388–96(1954).—Four methods for measuring solubilization (visual, nephelometric, refractometric, and depression of vapor pressure) gave results agreeing within ±12% for the uptake of C_6H_{14}, octane (I), and CH_2:CHCN (II) by a Na oleate (III) soln. Usually, the refractometric method gave the highest values, and the values were impossibly high when marked vol. changes occurred on mixing the detergent soln. (aliphatic Na sulfates) with "oils." The final uptake x (mol. of "oil" solubilized by one mol. of III) was achieved in 24 hrs. It increased with the concn. c of III, and dx/dc was greater at c above 90 g./l. than at c below 70 g./l. Apparently, the micelles of III were different or differently connected with one another in these concn. ranges. The x was greater for polar compds. than for hydrocarbons. Thus, at $c = 90$, x at 20° was 3.65 and 0.42 for octanol and I, resp., and 10.9 and 1.7 for cyclohexanol and cyclohexane. However, x was 0.89 for $C_6H_5NO_2$ and 2.42 for C_6H_6. II had $x = 2.82$, and CH_2:CMeCO$_2$Me 1.23. The x was smaller in K oleate solns.

J. J. Bikerman

Tr. Rebinder, P. A.

62

Investigation of the kinetics of the hydration of the cement clinker minerals by radioactive tracer methods. A. M. Smirnova and P. A. Rebinder. *Doklady Akad. Nauk S.S.S.R.* 96, 107-10(1954).—The rate of reaction in the hydration of tricalcium aluminate, tricalcium and dicalcium silicates is studied by exchanging the cation Ca^{++} from chloride solns. with the common Ca in the cryst. minerals. The specific surface of the cryst. phase is detd. by the absorption of a radioactive indicator from a soln., or from the initial rate of the base exchange (cf. Paneth and Vorwerk, *C.A.* 16, 3784). The decrease of the radioactivity of the Ca^*Cl_2 soln. with time of the base exchange gives the data for the detn. of the rate of the hydration, too. The base-exchange curves as functions of time are not much affected by the hydrolysis and true solubility of the clinker minerals. The influence of the concn. of the Ca^*Cl_2 solns., however, is considerable for $3CaO.SiO_2$; with increasing chloride contents (from 0.5 to 2.5 to 10%) the rate of base exchange is considerably reduced, the curves are much flattened, but above 10% this effect is about const. The final expts. were made with 0.25% Ca^*Cl_2 solns. Particularly rapid is the base exchange with $3CaO.Al_2O_3$ (38% after 5 min., 75% after 20 min.), and apparently ended after 3 hrs. Evidently, the formation of $3CaO.Al_2O_3.CaCl_2.nH_2O$ proceeds further with time. Considerably slower is the base exchange with $3CaO.SiO_2$ and $2CaO.SiO_2$ (in the latter only 5% after 20 min., 35% after 6 days, 80% after 20 days). The initial surface reaction is detd. by the rate $V_0 = [(d/dt)(i/i_\infty)]_0$, as a function of the dispersity of the clinker minerals. The reaction rate of the hydration proper is detd. by Butt's expts. (*C.A.* 43, 8636c), who explains the curves by an increasing reduction of the active surface of the grains with proceeding hydration. $3CaO.Al_2O_3$ as the most active ingredient in portland cements is structurally compared with bentonite in its rapid hydration. Microcleavage and fracturing are strong factors promoting these reactions as hydrolysis in $3CaO.SiO_2$ while $2CaO.SiO_2$ is practically not hydrolyzed. Base exchange is evidently the first reaction in the hydration mechanism of the clinker minerals as the manifestation of the first interphase boundary (surface) reactions. By tracer methods it will be possible to elucidate the details of the hydration process and the effects exerted by additional agents. W. Eitel

(1)

REBINDER, P. A .
USSR/Physical Chemistry

Card 1/1

Authors : Aslanova, M. S., and Rebinder, P. A. Academician

Title : Adsorption effects of elastic fatigue and creep in glass fibers

Periodical : Dokl. AN SSSR, 96, Ed. 2, 299 - 302, May 1954

Abstract : Investigations show that chemical reactions are not obligatory in processes leading to deformation and mechanical disruption of glass fibers. The greatest adsorption effects of elastic fatigue and creep were noticed during the addition to the water of alcohols and velon (vinylidine chloride) which are chemically inert with regard to glass. The adsorption effect increases as the stress during deformation approaches the limit of technical strength of glass fibers. At uniform stress the adsorption effect of elastic fatigue is greater in the case of thicker fibers. Fifteen references; 5 USSR since 1941; 1 German since 1863. Graphs.

Institution : Acad. of Sc. USSR, Institute of Phys. Chem. and All-Union Scientific-Research Institute of Glass Fiber.

Submitted : February 18, 1954

REBINDER P.A.

USSR.

The action mechanism of active aids in metal-cutting. G. I. Epifanov, N. A. Fleteneva, and P. A. Rebinder. *Doklady Akad. Nauk S.S.S.R.* 97, 2[redacted]. "cutting" effect of H_2O and org. liquids reduces the work required for cutting metals by decreasing the amt. of plastic deformation in the chips and in the surface layer of the article. The authors claim the effect to be due to a diffusion of foreign atoms into the lattice of the metal article, aided by the effects of the surface-active medium present.

W. M. Sternberg

Rebinder, P. A.

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 32/47

Authors : Markina, Z. N.; Pospelova, K. A.; and Rebinder, P. A., Academician

Title : Solubility of sodium oleate hydrosols in relation to their structure

Periodical : Dok. AN SSSR 99/1, 121-124, Nov 1, 1954

Abstract : The solubility of hydrosols was investigated in a wide range of concentrations of aqueous sodium-oleate solutions and compared with colloidal solubility. The structural-mechanical properties of a diluted solium oleate solution were measured with an Ubellode viscosimeter and the properties of highly concentrated solutions by means of a Shvedov device. The relation between colloidal solubility of certain organic liquids and the concentration of aqueous $NaC_{18}H_{33}O_2$ solutions was established. The deformation characteristics of the studied sodium oleate solutions were found to be closely related with their structural characteristics which determine the relation between colloidal solubility and concentration. Four references: 3-USSR and 1-French (1950-1952). Graphs.

Institution : The M. V. Lomonosov State University, Moscow

Submitted : July 26, 1954

REBINDER, P.A.

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 22/45

Authors : Logginov, G. I.; Rebinder, P. A., Academician; and Sukhova, V. P.

Title : Investigation of hydration hardening of calcium oxide

Periodical : Dok. AN SSSR 99/4, 569-572, Dec 1, 1954

Abstract : Hydration solidification (hardening) of CaO was determined by means of a special resistance calorimeter. The kinetics of structure-formation during hydration solidification of CaO was investigated by measuring the specific shear stress by means of a tangential shifting plate. The effect of plasticizing admixtures of surface-active substances and electrolytes on the rate of CaO hydration was established. Eleven USSR references (1936-1954). Graphs.

Institution : ...

Submitted : July 23, 1954

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 35/56

Authors : Epifanov, G. I.; Soloshko, F. P.; and Rebinder, P. A., Academician

Title : New method of determining the sliding friction coefficient and its application to the study of the adsorption-lubrication effect.

Periodical : Dok. AN SSSR 99/5, 801-804, Dec 11, 1954

Abstract : A new method is presented for the determination of the sliding-friction coefficient. The distinctive characteristic of this method is the existence of a nonstationary zone in which continuous conversion from rolling friction through mixed friction into sliding friction takes place. The stationary state of the system is the state of the pure sliding friction at which the system arrives gradually through asymptotic approximation. This asymptotic approximation of the system toward the stationary state, corresponding to the sliding friction, prevents any possibility for the origination of autovibration in the system. Such a system will have only a periodic vibrations which will lead it into a stable equilibrium state. Seven references: 6-USSR and 1-English (1933-1954). Graphs; drawing.

Institution: Academy of Sciences USSR, Institute of Physical Chemistry

Submitted : September 28, 1954

REBINDER, P. A.

USSR/ Chemistry - Colloidal chemistry

Card 1/1 Pub. 124 - 2/45

Authors : Rebinder, P. A., Academician

Title : New problems of colloidal chemistry

Periodical : Vest. AN SSSR 2, 8-17, Feb 1955

Abstract : The history of the development of colloidal chemistry and its various fields of application are analyzed. It is pointed out that modern colloidal chemistry is developing as a new and independent field of science connected with the actural problems of natural science and technology. Several new problems confronting modern colloidal chemistry, such as the formation of structures in dispersion and high molecular systems, solidification of mineral binding (cementing) substances, strength and mechanical properties of solid bodies, application of surface active substances, etc., are discussed. Illustrations.

Institution : .....

Submitted : .....

Structure-mechanical properties of disperse and high-molecular systems. N. V. Mikhailov and P. A. Rebinder (Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). *Kolloid. Zhur.* 17, 107-19(1955); cf. *C.A.* 49, 7927*b*.—In liquidlike systems the effective viscosity η gradually decreases when the rate P of shear increases, whereas in solidlike bodies the drop of η occurs in a narrow interval of P values. The mech. properties of all structures can be characterized by instantaneous shear modulus, equil. shear modulus, viscosity of elastic aftereffect, max. limiting viscosity, and limit of flow, whereas liquidlike systems, in addn., have a stress limit of structure. The structure can be reversible (thixotropic) or irreversible (crystals). Mixts. of these two structures occur, e.g., in concrete. Also in *Colloid J.* 17, 99-105(1955)(Engl. translation).

J. J. Bikerman

Rebinder, P.A.

V Elastic-viscous properties of thixotropic structures in aqueous suspensions of bentonite clays. L. A. Abdurazimova, P. A. Rebinder, and N. N. Serb-Serbina (Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). *Kolloid. Zhur.* 17, 184-95 (1955); cf. *C.A.* 49, 10010g.—At very small shearing stresses P (dynes/sq. cm.), bentonite suspensions behaved as Hookean bodies; the equil. shearing modulus E was 14,000, 300, 60,000, and 54,000 dynes/sq. cm. for 10% Na bentonite (I), 10% natural bentonite (II), 30% II, and 45% Ca bentonite (III), resp. When a small P acted long enough, the suspensions started "creeping," and the corresponding viscosity η was 9×10^8, 32×10^7, and 38×10^8 poises for 10% II, 10% I, and 45% III, resp. When P increased past, e.g., 100 dynes/sq. cm., η decreased on increasing P, but the decrease was gradual until, e.g., $P = 500$; however, on a further increase in P, η suddenly dropped to, e.g., 1000 poises, and remained relatively independent of P at even higher P values. Also in *Colloid J. U.S.S.R.* 17, 171-80 (1955)(Engl. translation). J. J. Bikerman

REBINDER, P.A.; POSPELOVA, K.A.

Comments on E.M.Spivakova's paper "The mechanism of solubilization and the dependence of the solvent power of emulsifiers on their molecular nature." Koll.zhur.17 no.5:408 S-O '55. (MLRA 9:1)
(Emulsions) (Spivakova, E.M.)

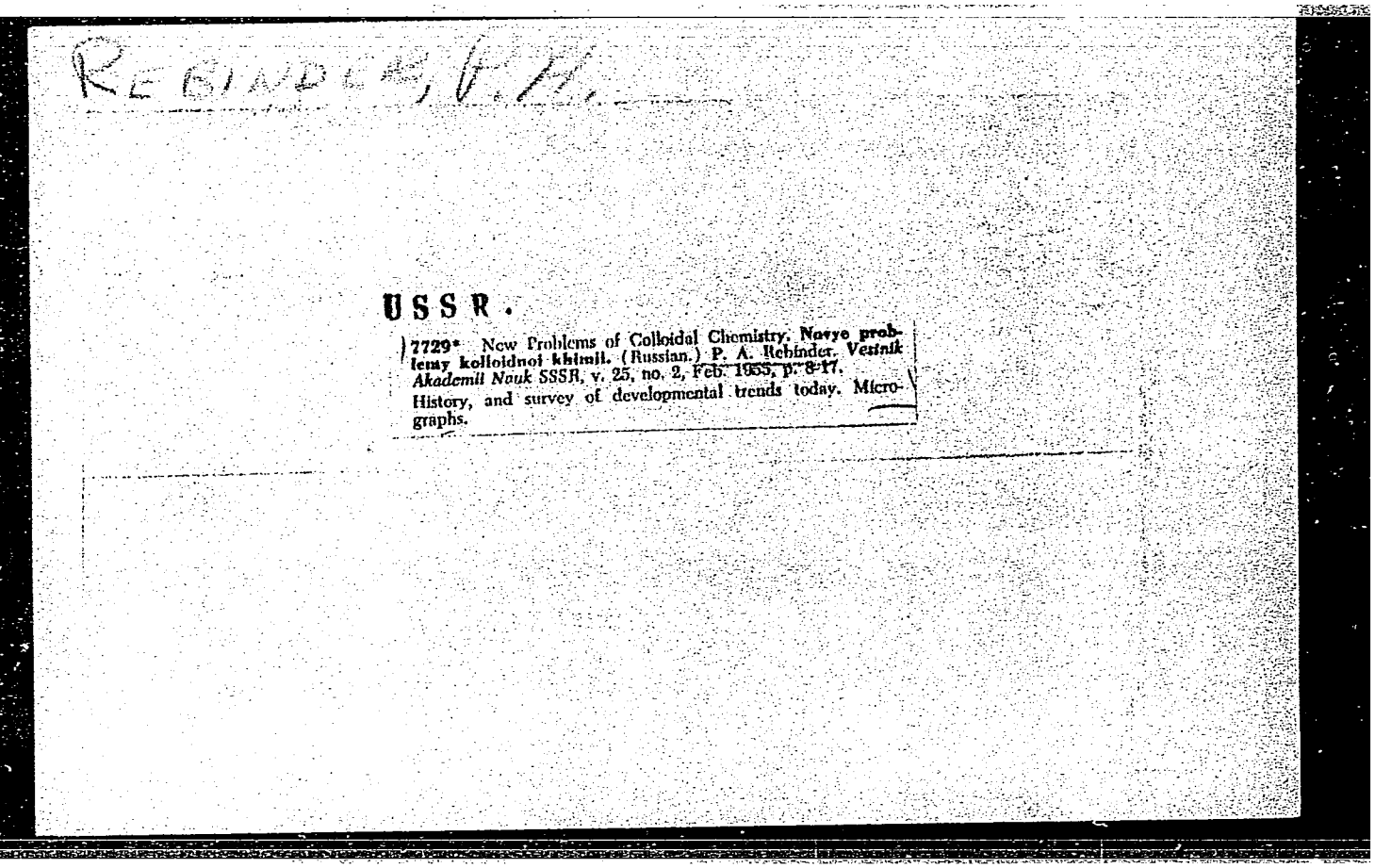
REBINDER,P.A., akademik.

New paths of scientific research. Nauka i zhizn' 22 no.4:16 Ap '55. (MLRA 8:6)
(Atomic energy research)

REBINDER, P.A., akademik, professor; SEGALOVA, Ye. Ye., kandidat khimicheskikh nauk, dotsent.

The formation and disintegration of structures. Nauka i zhizn' 22 no.5:21-24 My '55. (MLRA 8:6)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.
(Colloids)(Solids)



REBINDER, P.A.

USSR.

7729* New Problems of Colloidal Chemistry. Novye problemy kolloidnoi khimii. (Russian.) P. A. Rebinder. *Vestnik Akademii Nauk SSSR*, v. 25, no. 2, Feb. 1955, p. 8-17.
History, and survey of developmental trends today. Micrographs.

REBINDER, P.A.

USSR/Scientists - Chemistry

Card 1/1 Pub. 147 - 1/21

Authors : Rebinder, P. A.; Dolin, P. I.; Kabanov, B. N.

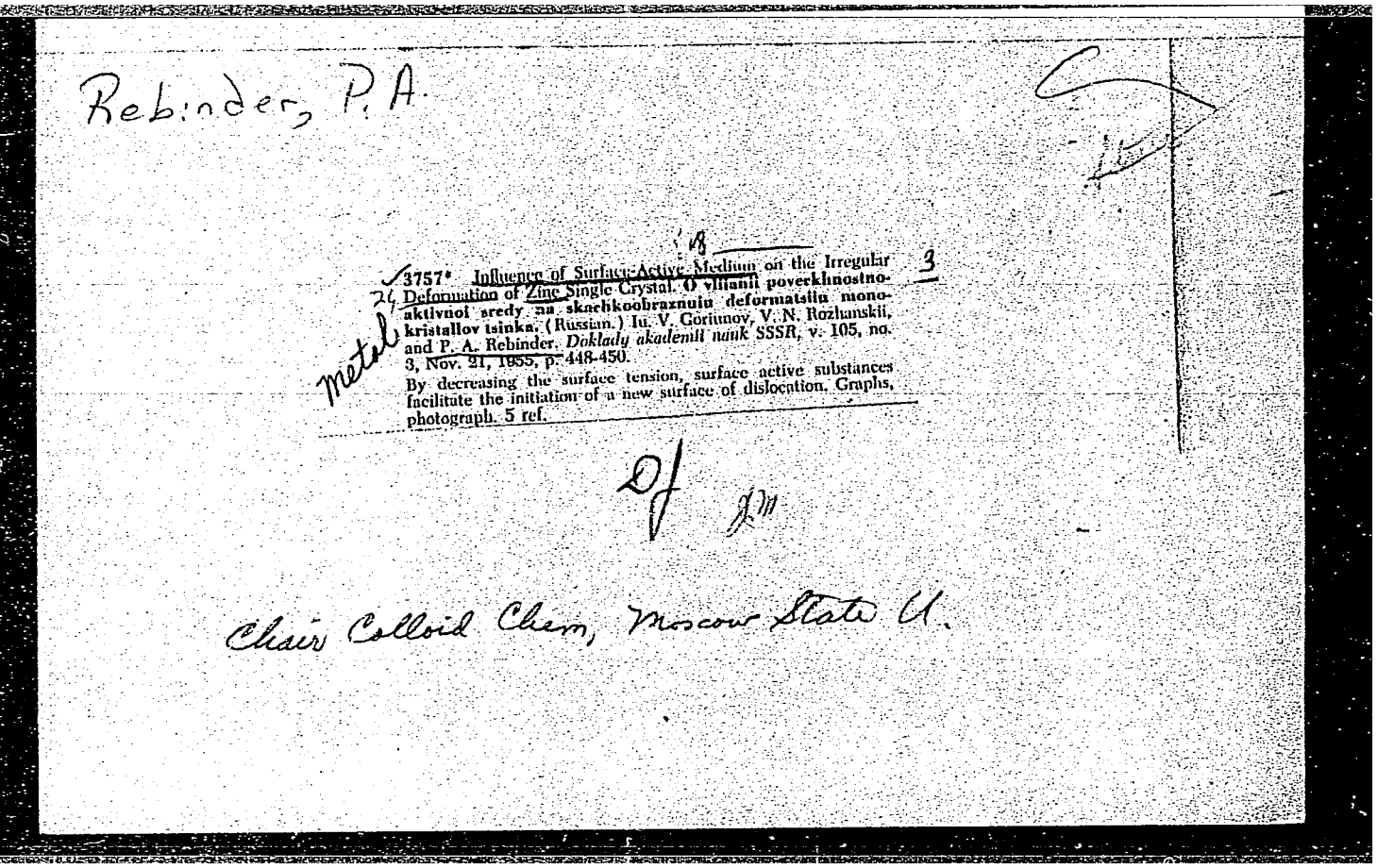
Title : The work of A. N. Frumkin and his school in the field of surface phenomena and kinetics of electron processes

Periodical : Zhur. fiz. khim. 29/10, 1746-1750, Oct 1955

Abstract : Honoring the 60-th birthday of the famous Soviet physico-chemist, Academician Aleksandr Naumovich Frumkin, a group of his colleagues published a list of Frumkin's scientific research work on surface phenomena and the kinetics of electrode processes.

Institution : .....

Submitted : .....



Rebinder, P. A.

3757* Influence of Surface-Active Medium on the Irregular Deformation of Zinc Single Crystal. O vliianii poverkhnostno-aktivnoi sredy na skachkoobraznuiu deformatsiiu monokristallov tsinka. (Russian.) Iu. V. Goriunov, V. N. Rozhanskii, and P. A. Rebinder. *Doklady akademii nauk SSSR*, v. 105, no. 3, Nov. 21, 1955, p. 448-450.

By decreasing the surface tension, surface active substances facilitate the initiation of a new surface of dislocation. Graphs, photograph. 5 ref.

Chair Colloid Chem, Moscow State U.

REBINDER, P.A.; YAMPOL'SKIY, B.Ya.; SEGALOVA, Ye.Ye.

Development of the main trends in scientific activities of the Department of Colloidal Chemistry at the Moscow State University. Uch.zap.Mosk.un. 174:295-300 '55. (Colloids) (MLRA 9:7)

GRIGOROV, O.N.; KOZ'MINA, Z.P.; MARKOVICH, A.V.; FRIDRIKHSBERG, D.A.; REBINDER, P.A., akademik, otvetstvennyy redaktor; KREMLEV, L.Ya., redaktor izdatel'stva; OKERBLOM, M.A., redaktor izdatel'stva; RAVDEL', A.A., redaktor izdatel'stva; KIRNARSKAYA, A.A., tekhnicheskiy redaktor

[Electrokinetic characteristics of capillary systems; monographs on experimental studies conducted under the direction of I.I.Zhukov, correspondent-member of the U.S.S.R. Academy of Sciences, by his students] Elektrokineticheskie svoistva kapilliarnykh sistem; monograficheskii sbornik eksperimental'nykh issledovanii. Vyp.pod rukovodstvom I.I.Zhukova ego uchenikami. Moskva, 1956. 352 p. (MLRA 10:1)

1. Akademiya nauk SSSR. Otdelenie khimicheskikh nauk.
(Capillarity)

REBINDER, P. A. Academician

"Structure Formation and Spontaneous Dispersion in Suspensions" (Strukturo-obrazovaniye i sameproizvol'noye dispergirovaniye v suspenziyakh) from the book Trudy of the Third All-Union Conference on Colloid Chemistry, pp. 7-18 Izd.AN SSSR, Moscow 1956

(Report given at the conference, held in Minsk 21-24 Dec 53)

Rebinder: Moscow, Inst. of Physical Chemistry AS USSR; Chair of Colloid Chemistry, Moscow State University

[redacted], I. A., and [redacted], Z. N.

"Colloid Solubility of Organic Liquids in Hydrosols of Surface Active Substances" (Kollidnaya rastvorimost' organicheskikh zhidkostey v gidrozolyakh poverkhnostno-aktivnykh veshchestv) from the book **Trudy of the Third** All-Union Conference on Colloid Chemistry, pp. 410-419, Iz. AN USSR, Moscow, 1956

(Report given at above meeting, Minsk, 21-4 Dec 53)

Rebinder: Academician

REBINDER, P.A., akademik, otvetstvennyy redaktor; YERMOLENKO, N.F., otvetstvennyy redaktor; KARGIN, V.A., akademik, redaktor; DUMANSKIY, A.V., redaktor; DERYAGIN, B.V., redaktor; DOGADKIN, B.A., professor, redaktor; FUKS, G.I., redaktor; YEGOROV, N.G., redaktor izdatel'stva; MOSKVICHEVA, N.I., tekhnicheskiy redaktor

[Proceedings of the Third All-Union Conference on Colloidal Chemistry] Trudy Tret'ei Vsesoiuznoi konferentsii po kolloidnoi khimii. Moskva, Izd-vo Akademii nauk SSSR, 1956. 494 p. (MLRA 9:11)

1. Vsesoyuznaya konferentsiia po kolloidnoy khimii, 3d, Minsk, 1953.
2. Chlen-korrespondent AN SSSR (for Dumanskiy, Deryagin) 3. Deystvitel'nyy chlen AN SSSR (for Yermolenko)
(Colloids)

REBINDER, P.A., akademik; NOVOSELOVA, A.V., otv.red.

[Program in colloidal chemistry; for the Chemistry Faculty] Programma po kolloidnoi khimii (dlia khimicheskogo fakul'teta). 1956. 6 p. (MIRA 11:3)

1. Moscow. Universitet. 2. Chlen-korrespondent AN SSSR (for Novoselova)
(Chemistry, Physical and theoretical--Study and teaching)

USSR/ Physical Chemistry - Colloid chemistry. Desperse systems B-1

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11407

Author : Rebinder P.A.
Inst : Academy of Sciences USSR
Title : On Nature of Plasticity and Structure-Formation in Disperse Systems

Orig Pub : Sb. posvyashch. pamyati akad. P. P. Lazareva, M., AN SSSR, 1956, 113-121

Abstract : Review of work carried out under the direction of the author. Bibliography 24 references.

1/1

REBINDER, P., akademik.

Vibration gridndingis the most efficient modern method of rock crushing. Stroi.mat., izdel.i konstr. 2 no.1:8-10 Ja '56. (MLRA 9:5)

1. Predsedatel' komissii Akademii nauk SSSR po vibropomolu.
(Crushing machinery)

SMIRNOVA, A.M.; ZAYTSEVA, N.G.; RUBINDER, P.A.

Study of the specific surface of individual components of portland cement by means of radioactive tracers. [with English summary in insert] Koll.zhur.18 no.1:93-100 Ja-F '56. (MLRA 9:6)

1.Institut fizicheskoy khimii AN SSSR, Moskva.
(Binding materials) (Radioactive tracers)

REBINDER, P.A.

Chem The subject and the principles of construction of a course of colloid chemistry. S. S. Voyutskii and P. A. Rebinder. *Kolloid. Zhur.* 18, 253-6(1956).—Solns. of polymers should not, but suspensions should be, included. J. J. Bikerman

USSR/Chemistry of High Molecular Substances. F

Abs Jour : Referat. Zhurnal Khimiya, No 6, 1957, 19415.

Author : L.V. Ivanova-Chumakova, P.A. Rebinder.
Inst : -
Title : Elastic and Viscous Properties of Solutions of polyisobutylene.

Orig Pub : Kolloid. Zh., 1956, 18, No 4, 429-437.

Abstract : The elastic-viscous properties of polyisobutylene (I) solutions in toluene and xylene in the region of I concentrations from 0 to 100% were studied. It was established that the equilibrium elasticity modulus depended on the concentration of I in the concentration region from 20 to 50%, and it was shown that the magnitude of the elasticity modulus decreased together with the concentration considerably less sharply than the viscosity. The recovery time of elastic deformations after the removal of stress increases sharply with the increase of concentration of I and reaches

REBINDER, P.A.

2859. Laws governing the development of shear strains and stress relaxation in elastomers and their solutions. L. V. IVANOVA-CHUMAKOVA and P. A. REBINDER. *Koll. Zhur.*, 1950, 12, 340–6. Taking polyisobutylene as an example, the authors establish the laws governing the development of elastic deformation (elastic after effect) during constant stress, and the laws governing the fall in this deformation after removal of the load. The correspondence found between the deformation and the time includes a unique characteristic of the system investigated, which is found to be practically constant over the whole duration of the fall or development of deformation, and which does not depend upon the stress. An equation is established for stress relaxation at a given constant deformation. This equation agrees well with experimental results. It is contained in the supposition that the process of stress relaxation under constant deformation consists of the growth of elastic deformation and the deformation of viscous flow, this growth being equal to the loss in the nominal instantaneous deformation, taking into account the fact that the elastic deformation develops correspondingly to the laws established. There are 8 references.

3S2D25.663424

REBINDER, P. A.

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3 5

Peculiarities of the deformation behavior of gelatin gels. L. V. Ivanova-Chumakova, P. A. Rebinder, and G. I. Krus (Inst. Phys. Chem. Acad. Sci. U.S.S.R., Moscow). *Kolloid. Zhur.* 18, 682-90(1956); cf. *C.A.* 51, 5454h.—When shearing of a 5% gelatin gel between a steel plate and a Me methacrylate plate was slow enough and side effects (such as drying) were eliminated, the gel conformed to the earlier equations; its initial modulus of elasticity was, e.g., 1900 dynes/sq. cm. and the equil. modulus of elasticity 2800 dynes/sq. cm., both at 22.5°; at 20° these moduli were about twice as great. Also the rate of growth of deformation at const. load and the rate of its decay at zero load agreed with the theoretical equation; the ratio of the rate const. to stress was, e.g., 10^{-4} cm. sec./g. More concd. gels deviated from the theory. J. J. Bikerman

Dept Disperse Systems

Chem

RM MT

REBINDER P.A.

Category USSR/Solid State Physics - Mechanical Properties of Crystals and Polycrystalline Compounds E-9

Abs Jour Ref Zhur - Fizika No 2, 1957 No 3960

Author Rozhanskiy, V.N., Grigorov, Yu.V., Rebinder, P.A.

Title Errata to Article "On the Influence of a Surface-Active Medium on the Abrupt Deformation of Single Crystals of Zinc"

Orig Pub Dokl AN SSSR 1956 106 No 6 950

Abstract Citeem s Ref Zh Fiz 1956 28836

Card 1/1

Rebinder, P. A.

Electrocapillary effects of hardness reduction and the external metal friction. E. K. Venstrem, V. I. Likhtman, and P. A. Rebinder. *Doklady Akad. Nauk S.S.S.R.* 107, 105–7(1956).—New detns. were made by the pendulum method in 0.1*N* H_2SO_4, under conditions of surface deformation, with ground-glass fused upon the glass ball bearings, and in *N* KCl, under boundary-friction conditions and with no observable surface deformation (the ball bearing was a smooth glass ball). The capillary effects in the 2 cases were found to be inverted. 21 references.
W. M. Sternberg

JKM

Inst Phys Chem, AS USSR

REBINDER, P. A

626. Investigation of structure formation in aqueous suspensions of gypsum—V. N. IZMAILOVA, E. E. SEGALOVA, and P. A. REBINDER (*C.R. Acad. Sci. U.S.S.R.*, 107, No. 3, 425, 1956; from *Amer. Ceram. Abstr.*, 39, 206, 1956). In Russian. Experiments were conducted with aqueous suspensions of $CaSO_4.\frac{1}{2}H_2O$ containing finely ground quartz or calcite. Kinetics of structure formation were studied from the increase in plastic strength of the structure (shear limit). Structure formation proceeds in two stages: (1) plastic strength is very low and increases gradually; (2) there is a sharp increase in strength after 5 min which reaches a max. at 30 min. In the first stage, the structure has a coagulated nature. Crystallization of the dihydrate leads to the growth of small crystals, primarily surface nuclei, and to strengthening of the structural network with the formation of firm crystallization contacts.

RM mk

REBINDER, P.A.

Chem Colloid Chem.

The effects of adding organic liquids on the structure and mechanical properties of aqueous sodium oleate solutions. Z. N. Markina and P. A. Rebinder (M. V. Lomonosov State Univ., Moscow). *Doklady Akad. Nauk S.S.S.R.* 109, 1168–9(1956).—The solubilization of hydrocarbons or low-polarity org. liquids in aq. semicolloidal solns. (soaps) is a colloidal phenomenon, and is governed by the structural peculiarities of the micelles and the development of the spatial structure at high soap conchs. The colloidal dispersibility, being to a greater extent detd. by the micellar structure of the surface-active semicolloids, exerts in its turn a strong effect on that structure (*C.A.* 49, 2818*h*; 50, 14186). The org. liquids tested were of 2 kinds, and affected the colloidal properties in opposite ways: Nonpolar liquids (C_4H_{10}, $C_{12}H_{26}$, cyclohexane) solubilize the micelles and cause a thinning out of the system; polar liquids (some ales., C_4H_9OH) thicken the soln. by converting it into a true gel, and the stiffening is caused by a bridging of the micelles by the polar mols. The thickening of the gel by the addn. of C_4H_9OH may be due to the hydrophobization of the soap micelles. W. M. Sternberg

4

45-4j-1

SUBJECT USSR / PHYSICS
AUTHOR CISTOTA, S.JA., VEJLER, V.D., LICHTMAN, V.I., REBINDER P.A.
TITLE The Influence exercised by active Lubricants on the drawing of Metals.
PERIODICAL Dokl.Akad.Nauk, 110, fasc. 4, 562 - 565 (1956)
Issued: 12 / 1956

Here the rules and the mechanism of the influence exercised by lubricants on the drawing of a steel wire are investigated.On this occasion a wire made of steel O with the diameter of 1,97 mm was reduced to the diameter of 1,82 mm by drawing. Drawing velocity was 12 cm/min; drawing stress was measured by means of a dynamometer. The influence exercised on drawing by liquid hydrocarbons, alcohols and acids was investigated at 20 and 60°. A diagram illustrates the modification of stress in dependence on the number of carbon atoms in the chain of the individual hydrocarbon. If the number of C-atoms in the molecule of the lubricant is increased, the stress caused by drawing diminishes. Hydrocarbons which are liquid at room temperature from hexane to zetane ($C_{16}H_{34}$) diminish stress by 9 %. In from methyl to dexyl-alcohol as well as from proprion to pelargon acid at 20° stress is reduced by 23 %. At 60° the effect of alcohols does not change, but the acids reduce stress by 40 %. Mineral oils are little effective as lubricants especially at higher temperatures. The rather high efficaciousness of alcohols and acids at 20° can be explained by the rather firm absorption binding of these substances binding themto the metal surface. This entails also a plastification of the surface layer of the metal in the presence of surface-active substances.

Such a mechanism recommends itself by numerous favorable tests with respect to the

Dokl.Akad.Nauk, 110, fasc. 4, 562 6 565 (1956) CARD 2 / 2 PA - 1639

extension of monocrystals and polycristalline metals in the case of the existence of adsorption-active substances. Furthermore, artificially applied plastic coatings facilitate the working of steel under pressure considerably. The increase of the viscosity of the lubricant exercises a favorable influence on the process of drawing. By the addition of the viscosity-dependent lubricating properties and activity, the total effect exercised by the lubricant is obtained. The viscosity properties of the lubricant are of essential importance in connection with the working of metals under pressure only if conditions of the deformation warrant a sufficient thickness of the lubricating layer. This is e.g. the case with blade-formed drawing. If a wire is repeatedly drawn with a 0,4% soapy solution stress diminished rapidly after the first stages of the drawing process, and it remains constant in the course of further drawing processes. However, in vaseline oil stress diminishes gradually with each drawing process. Previous compression of the metal causes its solidification. The physical-chemical properties and the adsorption activity of the medium exercise decisive influence on the drawing process.

INSTITUTION : Institute for Physical Chemistry of the Academy of Sciences of the USSR.

SEGALOVA, Ye.Ye.; IZMAYLOVA, V.N.; REBINDER, P.A., akademik.

Development of crystallization structures and variation of their mechanical strength. Dokl.AN SSSR 110 no.5:808-811 O '56. (MLRA 10:1)

1. Kafedra kolloidnoy khimii Moskovskogo gosudarstvennogo universiteta imeni M.V. Lomonosova.
(Crystallization, Water of) (Gypsum)

REBINDER, P. A.

5
1-RD
4E2c

18

Mechanism of action of lubricants in the forming of metals. S. Ya. Veller, V. I. Likhtman and P. A. Rebinder (Dokl. Akad. Nauk SSSR, 1956, 110, 985—988).—Under conditions of great pressure between metallic surfaces, a plastic flow in the surface layer of the softer metal occurs, and the external friction is replaced by internal friction. This internal friction can be reduced by the use of surface-active lubricants which by adsorption increase the plasticity of the surface layer. The active lubricant also produces an increase of the elastic "spring-back" after working and improves the quality of the worked surface. P. COLLINS.

JMB RD

Inst Phys. Chem, AS USSR

Rebinder, P. A.

11
1-RB

The adsorptional lowering of the strength of single crystals of metals and their spontaneous dispersion in the liquid phase. P. A. Rebinder, V. I. Likhtman, and L. A. Kochanova. *Doklady Akad. Nauk S.S.S.R.* 111, 1278-81 (1956).—The lower strength of metallic systems caused by interfacial tensions is discussed, and the very high surfactant values of fused substances of similar chem. properties is pointed out, such as the effects of low-melting metals and alloys on metals, or fused glasses or salts on glasses and ionic crystals, in particular in the presence of the same cations. The elongation diagram at a uniform rate of 15%/min. of 99.99% Zn single crystals, uncoated or electrolytically coated with 1-5 μ of Sn are shown, and photographs of uncoated and coated Zn crystals, the former at 105% elongation, and showing the typical plastic rupture, the coated crystal with 9% elongation showing the brittle rupture. The tests were run at 400°. The effect is greatly magnified by a rise in temp., owing to a higher soly. of Zn in Sn. Similar results were obtained with the Pb-Sn system. The addn. of surfactant metals results in the development of a finer crystal structure, which may improve the mech. properties at room temp., but greatly lowers their heat resistance.
W. M. Sternberg

4E2c

Phys Struct

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amf

Dept. Disperse Systems,
Inst. Phys Chem AS USSR

AKUNOV, Viktor Ivanovich; REBINDER, P.A., akademik, redaktor; DEMINA, G.A., redaktor; PYATAKOVA, N.D., tekhnicheskiy redaktor

[Modern vibration mills without grinding parts] Sovremennye vibratsionnye izmel'chiteli bez meliushchikh tel. Pod red. P.A.Rebindera. Moskva, Gos.izd-vo lit-ry po stroit.materialam, 1957. 73 p. (MLRA 10:9)

1. Predsedatel' komissii Akademii nauk SSSR po tonkomu (vibratsionnomu) izmel'cheniyu (for Rebinder)
(Milling machinery)

REBINDER, P. A. and Ya. B. FRIDMAN

"On the General Rule of the Deformation and Decay of Different Solid and Liquid Bodies in Rock," paper presented at the First All-Union Conference on Tectonophysics, Moscow, 29 Jan 1957 - 5 February 1957.

Inst. of Physical Chemistry, Acad. Sci. USSR

Sum 1563

REBINDER, P. A.

"Effect of Surface Active Medium Upon Strains and Rupture of Solid
A paper submitted at 2nd International Congress on Surface Activity, 8-12 Apr 57, London.

Institute of Physical Chemistry, Moscow, USSR.
E-5972

[redacted], P. ..., IVANOVA, CHURAKOVA, L. V.

"Viscosity and elasticity of Polymer Solutions and their measurement," a paper presented at the 9th Congress on the Chemistry and Physics of High Polymers, 28 Jan.-2 Feb 57, Moscow, Research Inst. Physical Chemistry,

B-3,084,395

REHBINDER, P. A.

"Structure formation by Hardening of Cements" a paper submitted at 2nd International Congress on Surface Activity, 8-12 Apr 57, London.

Institute of Physical Chemistry, Moscow, USSR.

E-5972

REBINDER, P.A.

137-58-5-10611

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5. p 250 (USSR)

AUTHORS: Rebinder, P.A., Yepifanov, G.I.

TITLE: Effect of a Surface-tension Reducing Medium on Boundary Friction and Wear (Vliyaniye poverkhnostnoaktivnoy sredy na granichnoye treniye i iznos)

PERIODICAL: V sb.: Razvitiye teorii treniya i iznashivaniya. Moscow, AN SSSR, 1957, pp 47-56

ABSTRACT: A literature survey is presented along with results obtained in the authors' experiments in investigating the effect of a surface-tension reducing medium on boundary friction (F) and wear. The experiments are founded on a method involving immersion of surfaces of F in excess lubricant (L), the latter being fluids ranging in polarity from water to non-polar hydrocarbon oils or a solution of a surface-tension reducing substance in a non-polar solvent. A schematic diagram of a new instrument for investigation of the physical chemical regularities of F and wear is presented. This instrument was used to study the effect of solutions of surface-tension reducing substances on the coefficient of F in boundary lubrication. It is established that in a pure benzene

Card 1/2

Effect of a Surface-tension (cont.)

medium the coefficient of F is not constant, but upon attaining a maximum value of ~0.7, corresponding to dry F, drops sharply to 0.3-0.4 and then again rises to 0.7, and so forth. The hypothesis is advanced that these fluctuations, occurring at approximately equal time intervals, are due to infinitesmal contamination by surface-tension reducing substances not discoverable by ordinary methods. When surface-tension reducing substances are introduced into benzene in gradually increasing concentrations, the magnitude of the jumps diminishes, finally disappearing, and the coefficient of F takes on a completely stable value equal to ~0.1 in the case of the most powerful surface-tension reducing additives. It is shown that the action of lubrication under conditions of boundary F in the case of an arbitrarily established layer of L is purely adsorptive in nature. The adsorptive reaction, which may be promoted by the purely chemical bond between polar groups and atoms of metal, determines the strength of the bond of the lubricant layer and the surfaces of the metal. The phenomenon of adsorptive facilitation of the deformation and failure of solids is examined as it affects the process of adsorption fatigue and fatigue wear of microscopic asperities on the surface of mating contacts, as is the effect of active media on the process of the cutting of metals. Bibliography: 24 references.

Card 2/2 1. Friction--Theory

L.G.

67078
SOV/124-59-1-1068

5.3830

Translation from: Referativnyy zhurnal. Mekhanika, 1959, Nr 1, p 148 (USSR)

AUTHORS: Rebinder, P.A., Ivanova-Chumakova, L.V.

TITLE: The Structural-Mechanical (Viscous-Elastic) Properties of Solutions of Polymers and the Methods of Their Measurement

PERIODICAL: V sb.: Uspekhi khimii i tekhnologii polimerov. Vol 2. Moscow, Goskhimizdat, 1957, pp 146-170

ABSTRACT: For the investigation of the rheological properties of polymer solutions in an almost homogeneous field of tensions and deformations, rotatory viscosimeters of the type of the Shvedov and Gudiv devices with torsion-dynamometers, with narrow clearances between the movable and the immovable elements of the working organ were employed, as well as the instruments based on the shear of the specimen material, having the form of a parallel piped, between two channeled plates. For description of the structural-mechanical properties of the polymer solutions the system of rheological characteristics is utilized. The authors are distinguishing between the two types of tension relaxation: the real relaxation due to the "secular" yield of the materials with the maximum viscosity limit, and the elastic

Card 1/2

The Structural-Mechanical (Viscous-Elastic) Properties of Solutions of Polymers and the Methods of Their Measurement

relaxation due to the redistribution of tensions with time between the "instantaneous-elastic" and the elastic elements. The following equation of elastic relaxation is proposed for the solutions of high-polymers:

$$P - P_L = (P_o - P_L) \exp\left(-\frac{\tau}{\theta^*}\right), \qquad P_L = P_o \frac{E_2}{E_1 \quad E_2}$$

wherein P_o and P are the initial tension and tension at the point of time τ, θ^* is the period of elastic relaxation, E_1 and E_2 are the conditional instantaneous and the elastic modulis respectively. Bibl. 25 titles.

N.I. Malinin

Card 2/2

REBINDER, P. A. (acad.) and VINOGRADOV, G. V. (Prof.)

"On Methods Characterizing the Viscous Elastic Qualities of Polymeric Solutions and the Application of New Rheological and Optical Polarization Methods."

Inter-vuz Scienctific Conference (Mezhvuzovskiye nauchnyye Konferentsii)

Vestnik Vysshey Shkoly, 1957, # 9, pp. 73 - 76 (USSR)

Abst: In January 1957, the Second All-Union Conference on Photosynthesis took place, organized by the institue of Plant Physiology of the Academy of Sciences, USSR, and by the Facultys of Soil-Biology of the Moskva University. About 700 representatives of 130 scientific-research institutes, vuzes and ministeries were present. The introductory report was made by Academician A. L. Kursanov who described the development of photosynthesis during the last ten years and invited the scientists to concentrate their work on the application of radioactive and stable isotopes. Nearly 100 reports were read: 13 on photochemistry, 9 on the investigation of chloroplast structure, 19 on the investigation of pigments, 9 on the photosynthesis of water plants, bacteria, etc.

Rebinder, P. A.

30-10-4/26

AUTHOR: Rebinder, P. A., Academician

TITLE: The Physico-Chemical Mechanics: a New Branch of Science (Fiziko-khimicheskaya mekhanika kak novaya oblast' znaniya).

PERIODICAL: Vestnik AN SSSR, 1957, October, Nr 10, pp. 32-42 (USSR)

ABSTRACT: The new branch of science - the physico-chemical mechanics - combines the ways and methods of molecular physics of solid bodies, the general science of the strength of materials, as well as the physical and colloid chemistry.
The rules governing the synthesis of various solid bodies with given mechanical properties are especially investigated.
Besides, there are two problems in the foreground:
a) Investigation of the processes with various methods of surface treatment.
b) Determination and theoretical clarification of questions arising at the formation of new phases of dispersion (solid form), or undercooled alloys.

A reply to the question how mechanical processes act an influence on solid bodies which were exposed to physico-chemical processes is of particular importance. In this context it is essential to know how the chemical energy

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is converted into mechanical energy, and vice-versa. These phenomenona are called mechanical chemistry.
The processes of adsorption are an other field the new branch of science is concerned with. The effects of the reduction of surface tension, the effect of "active" lubricants at the processing of metals, and the influence of additives on the properties of concrete, belong to this field.
The raised problems are mainly treated in the sole institute of AS USSR hitherto existing - the Institute of Physico-Chemical Mechanics, in which case a close contact is established with the institutes of construction engineering and architecture.
There are 2 figures, and 14 references, 12 of which are Slavic.

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Rebinder, P.A.

25-11-22/28

AUTHOR: None Given

TITLE: The Future Begins Today (Budushcheye nachinayetsya segodnya)

PERIODICAL: Nauka i Zhizn', 1957, # 11, pp 49-54 (USSR)

ABSTRACT: The article was compiled from essays by different scientists. Academician P.A.Rebinder outlines in his essay the possibilities for creating new building material based on future scientific achievements, especially in the field of physical chemistry.

According to Dotsent I.G.Lagunova the future task of medical science will not only consist in treatment of diseases but will concentrate on the prolongation of life. In the future many diseases may be eliminated by applying physical and chemical discoveries in the medical field, for instance, the use of isotopes for regulating the functioning of glands.

Academician D.I.Shcherbakov deals with the unlimited mineral resources and future methods of exploitation. Another future project in the agricultural field is the use of deserts and tundra zones for agriculture.

Professor V.P.Zenkovich gives an account of the huge resources of the seas and oceans which will be exploited in future decades. For instance, oil will be produced from the sea bottom; extensive fishing grounds will be created by feeding fish in bays or

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The Future Begins Today

special basins.
Professor G.I.Babat describes a fictional quantum-rocket in which nuclear fuel will be transformed into electro-magnetic radiation.
There are nine sketches.

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Rebinder, P.A.

AUTHOR: Rebinder, P. A. (according to publications record: Rehbinder) 62-11-2/29

TITLE: Some Results in the Development of Physico-Chemical Mechanics (Nekotoryye itogi razvitiya fiziko-khimicheskoy mekhaniki).

PERIODICAL: Izvestiya AN SSSR, Otdel.Khim. Nauk, 1957, Nr 11, pp. 1284-1297 (USSR)

ABSTRACT: The fundamental purpose of this new border field is 1.) explaining the laws and the process in the formation of solid bodies with given structure and given mechanical properties and 2.) investigating the course of the process in the deformation and destruction of solid bodies with regard to the physico-chemical factors. Both tasks are counected with the problems of modern colloid-chemistry Coagulation structures have a relatively low solidity, complete thixotropy and highly distinct plasticity. All particularities in coagulation structures can be explained when starting from the imagination of the thin residual intermediate layers of the liquid medium in the places of adhesion of the particles. The processes of the formation

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of the coagulation structure can be directed by active admixtures. The crystallization structures formed by immediate growing together of the crystals of the new phase have an extremely high solidity, no thixotropy and no plasticity. In order to obtain a dense, solid and durable concrete the processes of structure formation have to be directed by means of small additions of surface-active-plastificators and by mechanical vibration influence. Further crystalline modification processes in the areas of growing together cause a reduction of the solidity of the crystallisation structure and can be the fundamental cause for the destruction of the concrete and other structural material in water-saturated condition. Directing the deformation processes and those of destruction in the case of solid bodies, e. g. of metals, is not only possible by an adsorption influence of ordinary surface-active-media, but also by such influence of alloys or thim covers from surface-active-metal. These phenomena have been investigated in pure form in the elongation of zinc monocrystals which were covered by a thin layer of lead or mercury. They become manifest in a reduction of the solidity by ten times

Some Results in the Development of Physico-Chenical Mechanics

and in the occurrence of brittleness or (in connection with slighter tensions) in a high increase of the creep rate. The laws ascertained make it possible to control the mechanical metalworking processes as well as the processes of structure formation, friction and wear.
There are 7 figures and 25 references, 22 of which are Soviet.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR i Kafedra kolloidnoy khimii Moskovskogo gosudarstvennogo universiteta im. M.I. Lomonosova (Institute of Physical Chemistry of the AS USSR and Chair of Colloid Chemistry at the Moscow State University imeni M.V. Lomonosov)

SUBMITTED: September 16, 1957

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with the content of Ir but the rate of limiting H2O was formly raised only by small additions of I (e.g., 0.5%).
Ir. I. Bikerman

REBINDER, P. A.

Effect of fillers and solvents on the structural and mechanical properties of asphalts. S. Ye. Shalyt, N. V. Mikhailova, and P. A. Rebinder (Sc. Research Inst. Construction, Construction Ministry U.S.S.R., Moscow). *Kolloid. Zhur.*, 19, 244–61(1957); cf. *C.A.* 51, 8133i.—Addn. of fine Ca(OH)$_2$ powder to asphalt increased the max. viscosity η_0 (at small shears) according to $\eta_0 = \eta(1 + 7.5\varphi)$, where η is the max. viscosity of straight asphalt and φ the relative vol. of the filler, as long as φ is <0.12. At $\varphi > 0.16$, η_0 increased more rapidly with φ, and this increase was steeper, the lower was T; thus, at $\varphi = 0.25$, η_0/η was e.g., 183, 92, and 43, at 65°, 75°, and 85°, resp. $-d\log\eta_0/dT$ was independent of φ at $\varphi < 0.12$ and increased with φ at $\varphi > 0.16$. Addn. of "green oil" (a mixt. of high-mol. aromatic hydrocarbons) lowered η_0, e.g., to 0.01–0.0001 of η at $\varphi = 0.20$, and also $-d\log\eta_0/dT$ (e.g., 5-fold at $\varphi = 0.20$). By simultaneous addn. of Ca(OH)$_2$ and green oil it was possible to achieve a high η_0 (e.g., 3000 poises) and a relatively small $-d\log\eta_0/dT$ (e.g., 0.036). I. J. Rikenglaz

REPRODUCED

USSR/Physical Chemistry - Colloid Chemistry, Dispersion Systems. B-14

Abs Jour: Referat. Zhurnal Khimiya, No 2, 1958, 4045.

Author : O.I. Luk'yanova, Ye. Ye. Segalova, P.A. Rebinder.
Inst :
Title : Heat Liberation in Initial Period of Cement Hydration with Plasticizer Additions.

Orig Pub: Kolloidn. zh., 1957, 19, No 4, 459-464.

Abstract: Methods of quantitative study of initial heat liberation at cement (I) hydration under the conditions of cement mortar slaked inside a calorimeter were developed. The heat liberation kinetics at the initial hydration stage of gypsum-free I with various three-calcium aluminate contents and the influence of hydrophilic plasticizer SSB additions in amounts of 0.1 to 1.0% of the I weight on heat liberation kinetics were studied. The induction stage of I hydration (with reference to heat liberation) increases with the increase of the

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USSR/Physical Chemistry - Colloid Chemistry, Dispersion Systems. B-14

Abs Jour: Referat. Zhurnal Khimiya, No 2, 1958, 4045.

SSB addition, which causes the appearance of an induction stage of structural formation of the same duration. A gain in initial heat liberation as compared with cement mortar containing no plasticizer is observed in a wide range of SSB additions, which results in an increased strength of hydroaluminate crystallization structure in the corresponding structure formation stage.

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AUTHOR: Rebinder, P. A., Academician 32-10-13/32

TITLE: Comments

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol 23, Nr 10, pp 1184-1185 (USSR)

ABSTRACT: In his report delivered on the occasion of the 40th anniversary of the October revolution, the author stated that Soviet scientists, besides the study of molecular processes, occupied themselves mainly with their application in practice for the control of raw materials and finished products. Therefore, preference is given here to the measuring methods. A characteristic feature of Soviet science is its full adaptation to the requirements of political economy. This is manifested by the constant development of experimental methods, but also of theoretical possibilities of science. Besides he endeavors to adopt new methods and new experience for the benefit of Soviet technology, the Russians endeavor to bring the work of the Soviet works-laboratories to a stop-level in view of facilitating the promotion of proposals of perfectioning new inventions. Recent Soviet methods of investigation basically change measuring technique. The application of electronics with

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photographic recording make it possible to carry out measurements in milliseconds, which makes the use of highly complicated measuring devices, such as reflecting galvanometers and others, superfluous. Obsolete apparatus are continually being replaced by new ones which are more precise and more sensitive. The application of radioactive isotopes besides radiography and of decelerated neutrons, gamma-absorption and other new means offer new possibilities to measuring technique, defectoscopy, and automatized control. The methods of spectroscopic analysis, radiographic and electronographic investigation, as well as various methods of the analysis of structure are steadily gaining in importance. With the abolition of antiquated standard methods a new field of science, "physical-chemical mechanics" was created in the USSR. This field has its origin in the molecular physics of solids, the mechanics of materials, and physico-colloidal chemistry and is destined to obtain new hard materials with nonpredetermined properties, and structure; according to requirement. Basing on this example the endeavor should be made to abandon the usual standard-

 methods, as well as the antiquated measuring devices. For

Comments

mastering the nature and governing its processes correspondingly it is not sufficient to take readings and data on the instruments, but the processes should be "truly perceived". The author here laughs at an old scientist who, sitting at a table far away from the apparatus, notes down what his laboratory help, who worked on the apparatus, dictated to him. In conclusion, the author advises Soviet research workers and especially young scientists, not to confine their activities to "measuring" alone, but to endeavor to become real scientific investigators which will be the sole prerequisite for future success.

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SHCHERBAKOV, D.I., akademik; REBINDER, P.A., akademik.

Love and respect science and learn how to utilize its conclusions.
Tekh.mol.25 no.10:12-13 O '57. (MIRA 10:10)
(Research)

74-11-6/7

AUTHOR: Rebinder, P. A. (Moscow).

TITLE: The Development of Colloidal Chemistry in the USSR Since 40 Years (Razvitiye kolloidnoy khimii v SSSR za 40 let).

PERIODICAL: Uspekhi Khimii, 1957, Vol. 26, Nr 11, pp. 1320 - 1342 (USSR).

ABSTRACT: Immediately after world-war I the colloidal chemistry began to develop also in the USSR. Already in the years about 1920 the school of A. V. Dumanskiy organized all the necessary for its development. The Institute of Colloidal Chemistry was founded in 1932, and further institutes followed soon. The role of the development of complexes at the formation of colloidal particles was cleared up by Dumanskiy. He and Peskov were the originators of the actual conceptions of the role of the salt-padded (sol'vatnykh) envelopes, simultaneously with the charge (zaryad) at an aggregate-like steadiness of the colloidal particles. Rabinovich shew that the chemism is of importance at the formation of resistant colloidal systems. Peskov introduced new conceptions in the field of colloidal chemistry, like that of the kinetic resistance. S. Z. Roginskiy and Shal'nikov elaborated a method for producing pure colloidal systems. The method of Rabinovich which connects the colloidal chemistry with the electrochemistry of the solutions, and with photochemistry, was well

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The Development of Colloidal Chemistry in the USSR Since 40 Years. 74-11-6/7

criticized. The elaborate investigation of Kargin on the special mechanism of the formation of colloidal particles in solutions excited great interest. The problems of the phenomena taking place on the surface were further elucidated by Frumkin and his students, which lead to the connection of a series of questions of the colloidal chemistry with the electrochemistry. The few publications quoted show that this science which is closely connected with political economy contributed (and continues to contribute) its share in the construction of socialism.
There are 337 references, 135 of which are Slavic.

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